ERDC/CHL SR-16-4

US Army Corps
of Engineers®
Engineer Research and
Development Center

ERDC
INNOVATIVE SOLUTIONS
for a safer, better world

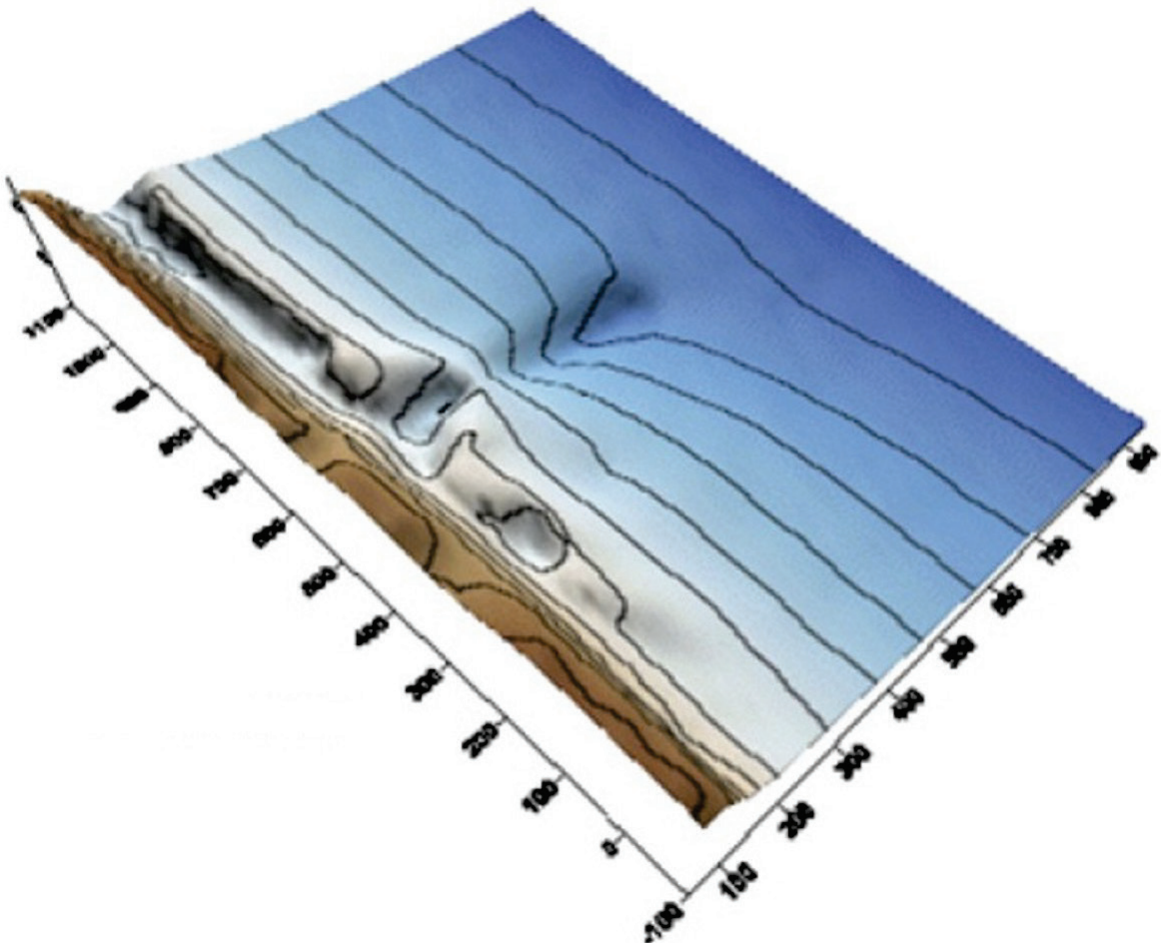
Coastal Ocean Data Systems Program

Field Research Facility Data Integration Framework Data Management Plan

Survey Lines Dataset

Michael F. Forte and Rose Dopsovic

August 2016



Coastal and Hydraulics Laboratory

The U.S. Army Engineer Research and Development Center (ERDC) solves the nation's toughest engineering and environmental challenges. ERDC develops innovative solutions in civil and military engineering, geospatial sciences, water resources, and environmental sciences for the Army, the Department of Defense, civilian agencies, and our nation's public good. Find out more at www.erdc.usace.army.mil.

To search for other technical reports published by ERDC, visit the ERDC online library at http://acwc.sdp.sirsi.net/client/default.

ERDC/CHL SR-16-4
August 2016

Field Research Facility Data Integration Framework Data Management Plan

Survey Lines Dataset

Michael F. Forte

Coastal and Hydraulics Laboratory
U.S. Army Engineer Research and Development Center
1261 Duck Road
Kitty Hawk, NC 27949

Rose Dopsovic

Bowhead Professional Solutions, LLC
Contractor for the Mobile District, Operations Division, Spatial Data Branch
U.S. Army Corps of Engineers
109 St. Joseph Street
Mobile, AL 36602

Final report

Prepared for U.S. Army Corps of Engineers
Washington, DC 20314-1000

Under Project Number A1070-FY16, "CHL Data Portal"

Abstract

This Data Management Plan details the Survey Lines Dataset which is maintained at the U.S. Army Corps of Engineers (USACE), Engineer Research and Development Center (ERDC), Coastal and Hydraulics Laboratory (CHL), Field Research Facility (FRF), Duck, NC. Information is organized within the following categories: General Description, Points of Contact, Data Stewardship, Data Documentation, Data Sharing, Initial Data Storage and Protection, Long-Term Archiving and Preservation, Hardware and Software Requirements, Products/Programs, Tools, and Data Catalog.

Contents

Figures and Tables

Figures

Tables

Preface

This study was conducted for the U.S. Army Corps of Engineers (USACE) under the Coastal Ocean Data Systems (CODS) Program, Project Number A1070-FY16; "CHL Data Portal." The technical monitor was Dr. J. P. Waters.

The work was performed by the Coastal Observations and Analysis Branch (CEERD-HFA) of the Flood and Storm Protection Division (CEERD-HF), U.S. Army Engineer Research and Development Center (ERDC), Coastal and Hydraulics Laboratory (CHL). The CODS Program is administered at ERDC CHL under the Navigation Research, Development, and Technology Transfer (RD&T) Program. At the time this effort was conducted, Jeffrey A. McKee was the Headquarters USACE Navigation Business Line Manager overseeing the CODS Program. At the time of publication of this report, Dr. J. P. Waters was Chief, CEERD-HFA; Dr. T. Wamsley was Chief, CEERD-HF; and W. Jeff Lillycrop was the ERDC Technical Director for Civil Works and Navigation RD&T. The Director of CHL was José E. Sánchez.

COL Bryan S. Green was the Commander of ERDC, and Dr. Jeffery P. Holland was the Director.

Abbreviations and Acronyms

3D	three-dimensional
ASA	(See RPS ASA)
ASCII	American Standard Code for Information Interchange
CEERD-HF	U.S. Army Corps of Engineers, Engineer Research and Development Center, Flood and Storm Protection Division
CEERD-HF-A	U.S. Army Corps of Engineers, Engineer Research and Development Center, Flood and Storm Protection Division, Coastal Observations and Analysis Branch
CESAM	U.S. Army Corps of Engineers, Mobile District
CESAM-OP-J	U.S. Army Corps of Engineers, Mobile District, Operations Division, Spatial Data Branch
CHL	Coastal and Hydraulics Laboratory
COAB	Coastal Observation and Analysis Branch
CODS	Coastal Ocean Data Systems
CRAB	Coastal Research Amphibious Buggy
DMS	dynamic motion sensor
ERDC	U.S. Army Engineer Research and Development Center
ERDC-CHL	U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory
Esri	Environmental Systems Research Institute
FDIF	Field Research Facility Data Integration Framework
FGDC	Federal Geographic Data Committee
FRF	Field Research Facility
Ft	feet
GB	gigabyte
GHz	gigahertz
GIS	Geographic Information System

GPS	global positioning system
ID	identification
ISO	International Organization for Standardization
JPG	Joint Photographic Experts Group (file format)
km	kilometers
LARC	Lighter Amphibious Resupply Cargo
LARC-V	Lighter Amphibious Resupply Cargo V
m	meters
MB	megabyte
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
PNG	Portable Network Graphics (file format)
POC	point of contact
RAID	redundant array of independent disks
RAM	random access memory
RPS ASA	RPS Applied Science Associates
RTK-GPS	Real-Time Kinematic Global Positioning System
SDSFIE	Spatial Data Standards for Facilities, Infrastructure, and Environment
TOPO	topographic
TSS	Teledyne TSS
USACE	U.S. Army Corps of Engineers
UTC	Coordinated Universal Time
WIS	Wave Information Studies
XML	Extensible Markup Language

Unit Conversion Factors

Multiply	By	To Obtain
feet	0.3048	meters

1 General Description

1.1 Background and purpose

The U.S. Army Corps of Engineers (USACE), Engineer Research and Development Center (ERDC), Coastal and Hydraulics Laboratory (CHL), operates the Field Research Facility (FRF), an internationally recognized coastal observatory established in 1977 and located on the Atlantic Ocean near Duck, NC. The ERDC CHL Coastal Observations and Analysis Branch (COAB) maintains a number of oceanographic datasets at the FRF, including winds, waves, water levels, currents, and beach morphology. Together, these datasets provide a 34-year record of coastal conditions and have become an important national resource for the coastal engineering and scientific communities.

To protect and preserve this important national archive, COAB has been charged with developing an FRF Data Integration Framework (FDIF) to provide a modern, discoverable archive with easily accessible information for strategic analysis and reporting. To accomplish this, COAB has partnered with the U.S. Army Engineer District, Mobile (SAM), Spatial Data Branch (CESAM-OP-J) and RPS Applied Science Associates (RPS ASA). Along with the FRF data, the ERDC CHL Wave Information Studies (WIS) data will be incorporated into the framework. It is intended that the results of this project will provide a framework that can be used by other data management groups within ERDC CHL and its District partners.

The beach morphology surveys on which this report focuses provide quantitative measures of the dynamic nature of the nearshore zone, including during storms when changes are most rapid. In addition, the natural, long-term cycle of beach erosion and rebuilding, which may take many years, is well documented. These data are being analyzed to refine theories of nearshore morphologic change and to develop and test numerical models of nearshore response to changing conditions.

1.2 Dataset name

Field Research Facility Survey Lines

1.3 Data keywords

- bathymetry
- beach morphology
- beach profiles
- beach transects
- CRAB (Coastal Research Amphibious Buggy)
- digital elevation model
- hydrographic survey
- LARC (Lighter Amphibious Resupply Cargo)
- morphology evolution
- profile evolution
- shoreline change
- topography
- volume change

1.4 Data description

The morphology surveys are conducted over a series of 26 shore-perpendicular *profile lines* spaced 50 meters (m) apart, which extend from the dune to varying lengths offshore up to 2 kilometers (km). These lines, which are surveyed monthly are shown in Figure 1, FRF survey map, including line numbers and wave measuring locations (black dots).

The ".3d" processed survey data file is an ASCII file described by 14 columns of information, including (1) the project location, (2) profile number, (3) survey number, (4) latitude, (5) longitude, (6) easting (North Carolina [NC] state plane, m), (7) northing (NC state plane, m), (8) FRF cross-shore coordinate (m), (9) FRF long-shore coordinate, m, (10) elevation (NAVD88, m), (11) ellipsoid value, m, (12) date, (13) UTC time, and (14) time in seconds from midnight. The FRF has more than 700 of these files with a total file size of ~1 GB as of January 2015.

In addition to the point data file, the FRF generates a regularly spaced, interpolated gridded file (Figure 2). This file is used to display the surface in three dimensions (3D), show depth contours, and calculate changes that have taken place since the prior survey. The ASCII file is described by three columns, including (1) latitude, (2) longitude, and (3) elevation.

Figure 1. FRF survey map, including line numbers and wave measuring locations (black dots).

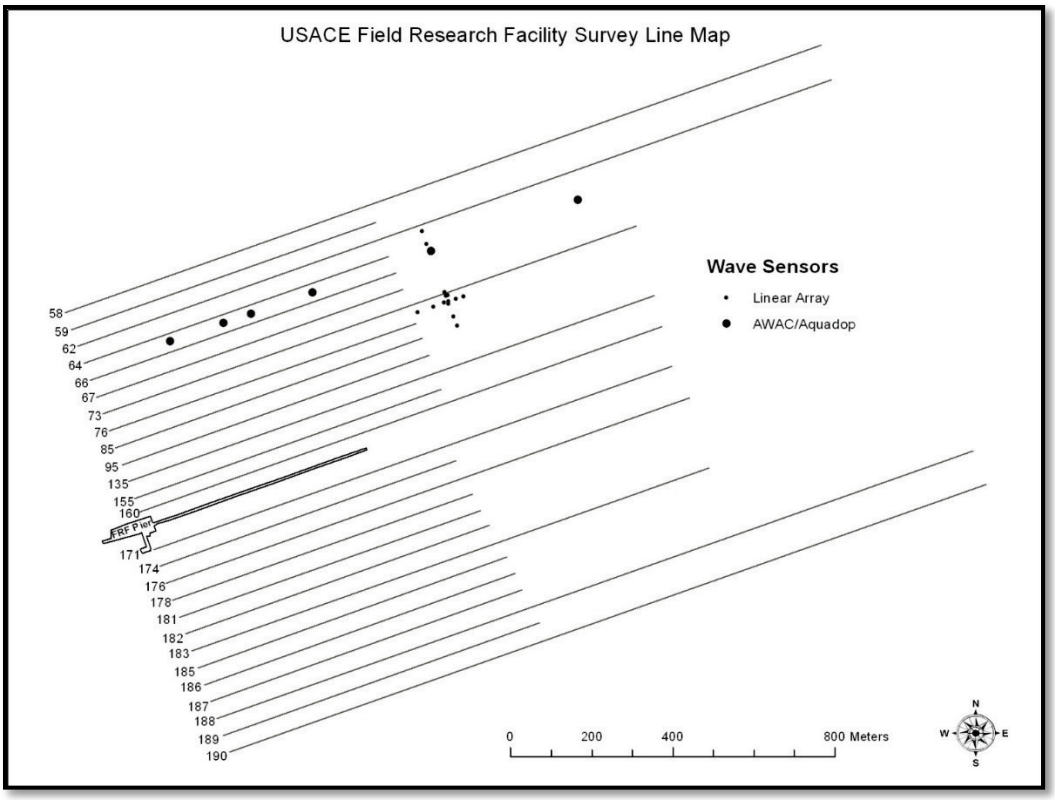
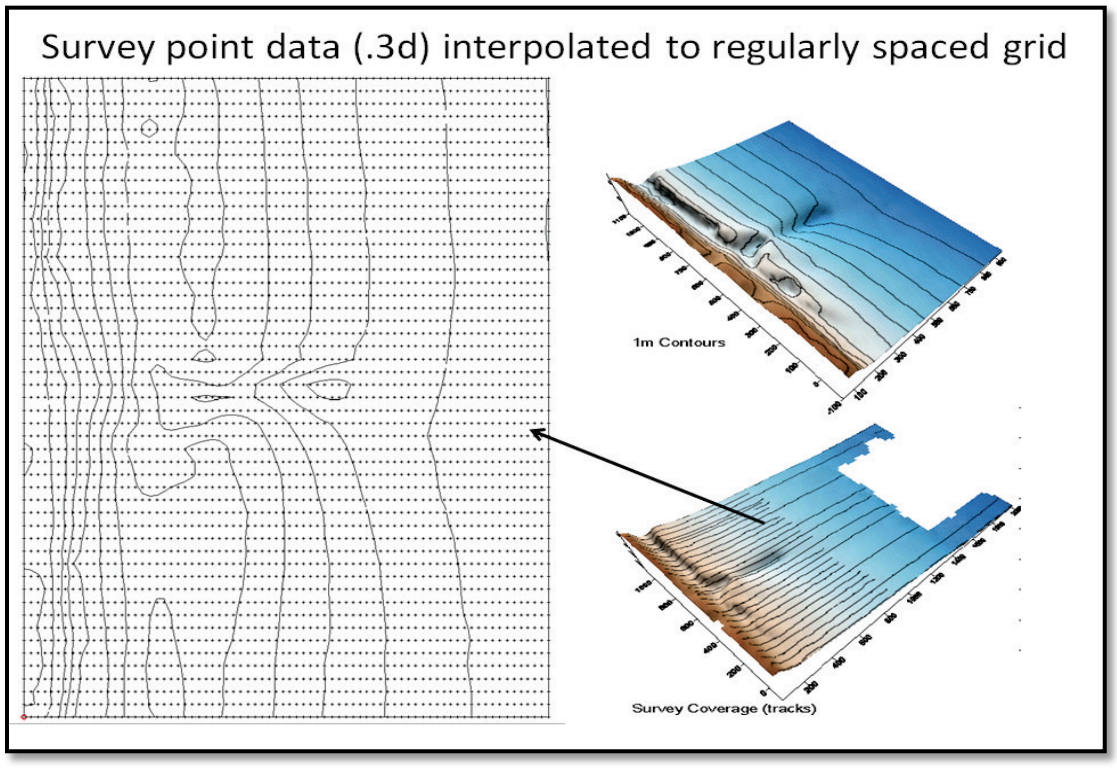


Figure 2. Example of interpolated data regularly spaced data points and grid contours (left) and 3D images displaying contours (upper) and survey line data (lower).



1.5 Data temporal extent

The survey lines are measured at monthly intervals and more frequently during large storms. In addition, prior to the year 2000, 4 of the 26 lines (58, 62, 188, and 190) were surveyed biweekly as part of a "4-line survey," which covers the two lines farthest to the north and the south from the FRF pier. The beach morphology surveys cover the period from July 1981 through the present.

1.6 Data geographic extent

The data covers USACE FRF property, beginning at the base of the dunes and extending approximately 3 km into the ocean to a -15 m bathymetry contour (Figure 1). The survey extents are encompassed within 36.177 – 36.188 degrees North Latitude and 75.754 – 75.725 degrees West Longitude.

1.7 Data types

The original data are in a comma-separated format without a header record. Three coordinate systems are included: (1) geographic, (2) North Carolina (NC) state plane, and (3) a local coordinate system known as the *FRF coordinate system* which was originally established in the 1970s. The origin of the FRF coordinate system is located behind the dune near the southern boundary of the FRF property at Latitude = 36° 10' 39.368875", Longitude = -75° 44' 58.882497", or in NC State Plane coordinates at Northing (m) = 274,093.698 and Easting (m) = 901,951.338. The baseline of the system (cross-shore distance zero) is perpendicular to the FRF pier and is aligned 18.14182902° West of True North. All coordinate data are in meters. Distances to the north along the baseline and distance directed offshore are positive. Survey data were originally collected in geographic coordinates which the survey software converts to NC State Plane.

Once data are imported into the FDIF, each survey dataset is transformed into geodatabase feature classes—(1) points (survey elevation points), (2) lines (profile lines), and (3) polygons (survey boundary)—and appended into a raster mosaic (elevation rasters). These data are made available for access through publically accessible web mapping and web feature services.

1.8 Data capture/creation method

Survey points are obtained using a Trimble RTK-GPS system combined with a Knudsen survey-grade echosounder and optionally, a Teledyne TSS Dynamic Motion Sensor (TSS DMS) 3-25 motion sensor. These components are mounted on an Army watercraft, a Lighter Amphibious Resupply Cargo V (LARC-V) vessel which is capable of continuous data collection from the beach, through the surf zone, and offshore. Conductivity, temperature, and depth are measured at the end of the FRF pier to a depth of -7 m on the day of survey to determine the speed of sound in the water column, which is used for adjusting the echosounder data. Data points are collected on average every 2.5 m. Topographic (TOPO) survey points on the beach and dune, above the elevation reached by the LARC-V, are collected with a walking, backpack-mounted Trimble RTK-GPS system. Since changes in the dune occur less frequently than do changes in the beach and offshore, TOPO points may be added from an earlier time period.

Other methods have been used in the past, including Total Station and also leveling techniques coupled with the use of the FRF specialized Coastal Research Amphibious Buggy (CRAB), a 35-feet (ft) tall motorized tripod capable of transiting the surf zone.

1.9 Data volume

From the more than 700 surveys covering 34 years, approximately 1 GB of data has accumulated as of January 2015. Approximately 20 MB are added annually.

1.10 Data restrictions

No personally identifiable information or other information whose distribution may be restricted by law or national security is included in this dataset.

1.11 Plan storage

This report will be stored at ERDC.

2 Points of Contact (POC)

2.1 Project POC

Michael F. Forte, Physical Scientist
USACE Field Research Facility
1261 Duck Road
Kitty Hawk, NC 27949
Michael.F.Forte@usace.army.mil, (252) 261-6840 x228

2.2 Overall POC

Jeffrey P. Waters, Chief
Coastal Observations and Analysis Branch
USACE Field Research Facility
1261 Duck Road
Kitty Hawk, NC 27949
Jeffrey.P.Waters@usace.army.mil, (252) 261-6840 x233

2.3 Data Quality POC

Michael F. Forte, Physical Scientist
USACE Field Research Facility
1261 Duck Road, Duck NC 27949
Michael.F.Forte@usace.army.mil, (252) 261-6840 x228

2.4 Data Collection POC

Michael F. Forte, Physical Scientist
USACE Field Research Facility
1261 Duck Road, Duck NC 27949
Michael.F.Forte@usace.army.mil, (252) 261-6840 x228

2.5 Documentation/Metadata POC

Michael F. Forte, Physical Scientist
USACE Field Research Facility
1261 Duck Road, Duck NC 27949
Michael.F.Forte@usace.army.mil, (252) 261-6840 x228

2.6 Data Storage/Disaster Recovery POC

Michael F. Forte, Physical Scientist
USACE Field Research Facility
1261 Duck Road, Duck NC 27949
Michael.F.Forte@usace.army.mil, (252) 261-6840 x228

2.7 DMP Adherence/Implementation POC

Michael F. Forte, Physical Scientist
USACE Field Research Facility
1261 Duck Road, Duck NC 27949
Michael.F.Forte@usace.army.mil, (252) 261-6840 x228

3 Data Stewardship

3.1 Quality control

The GPS survey equipment is calibrated to a known position to ensure horizontal and vertical accuracy before data collection begins. Processed data are then compared to the previous surveys and visually inspected to ensure quality.

3.2 Data lifecycle

1. Data are collected by the FRF.
2. Data are transformed into SDSFIE-compliant feature datasets in the designated USACE Mobile District (CESAM) Database schema.
3. Respective metadata are applied to each of the uploaded surveys.
4. All uploaded data and metadata are available through a publicly available web mapping service.

4 Data Documentation

4.1 Metadata repository

The FRF Survey Loader Application provides a point of entry for collected metadata. Metadata records available in Federal Geographic Data Committee (FGDC), or ISO-19115, standards are supported by this desktop application.

The authorized user has the ability to upload the digital metadata record, in the form of an XML file, into the enterprise Metadata Manager, an online metadata clearinghouse tool using the Environmental Systems Research Institute (Esri) Geoportal technology. Once the XML metadata is loaded into the Metadata Manager, a unique ID with a globally unique identifier data type is generated. As part of the FRF Survey Loader application, this unique ID is stored in the *sdsMetadataID* attribute of each related vector feature in the FDIF database that uses this metadata record.

Once the metadata record is available in the FDIF system, the user has the opportunity to relate submitted survey numbers to the respective metadata record. When the relationship is created (or modified), the assigned *sdsMetadataID* is perpetuated throughout the vector features (SurveyPoint, SurveyJob, ElevationContour, StationLine) to retain the connection to the related metadata record.

4.2 Additional metadata

Standard and consistent language is used throughout each metadata record to detail POC, keywords, and themes.

Category: Elevation

Metadata keywords:

- barrier islands
- beaches
- beach profiles
- coastal processes
- earth science

- elevation
- hydrographic survey
- oceans
- sediment transport
- shoreline

POC: <*USACE-FRF-Survey Manager*>

As surveys are uploaded into the FDIF and assigned a metadata record, each will initially be tagged in the *Use Limitation* section of metadata as "Quality Analysis/Quality Control Not Complete." When an FDIF representative reviews the integrated surveys, this tag will be removed from the survey.

4.3 Data/Metadata standards

The metadata elements in this data collection will be represented according to FGDC and ISO-19115 standards. FGDC standards are acceptable for legacy datasets. ISO-formatted metadata records should be completed for all new records.

5 Data Sharing

5.1 Data availability

Data are intended for scholarly use by the research community with the express agreement that users will properly acknowledge the USACE ERDC, CHL, and the supporting investigator(s). Use or reproduction of these data for commercial purposes is prohibited without prior written permission.

5.2 Data availability restrictions

There are no restrictions on the availability of the data.

5.3 Data access restrictions

There are no restrictions on access of the data. Full acknowledgement of observational and modeling data supplied by the CHL provides an important metric to assess, and ultimately continue, FRF service to the coastal research community.

The following citation should be included in any use of these data:

> Data are provided by the U.S. Army Corps of Engineers, Research and Development Center, Coastal and Hydraulics Laboratory, Field Research Facility, Duck, North Carolina.

Specific investigators and/or relevant research programs should also be acknowledged for their contributions.

5.4 Data access protocols

All data processed by the FRF Survey Application will be accessible from an enterprise database through the use of standardized web mapping services. At a minimum, the survey points (SurveyPoints), extent of survey polygons (SurveyJob), and raster grid surface will be accessible.

5.5 Catalog registration

These data will be registered through a geoplatform available at http://geoplatform.usace.army.mil/.

6 Initial Data Storage and Protection

6.1 Initial data storage location

Data is currently stored at the FRF in Duck, NC; however, the goal is to store it in a database in the CESAM, Mobile, AL, with a separate schema to solely support survey line data collected at the FRF. The CESAM-OP-J will serve as the database administrator.

6.2 Data storage protection

Data protection is provided through availability on a mirrored redundant array of independent disks (RAID) system in a different (separate) building at the FRF in Duck, NC.

6.3 Data access protection

Access to restricted data will be managed via password. Additional details will be provided if and when restricted data are designated to be included in the FDIF system. Otherwise, there are no limitations to data access.

7 Long-Term Archiving and Preservation

7.1 Data archiving location

The data will be archived and preserved in the USACE SAM data server.

7.2 Data archiving strategy

The FRF Survey Loader Application was created to support the FDIF program. This tool guides the user through the steps necessary to process and store all survey data when acquired. This is the primary strategy for the standard archiving and preservation of all FRF survey data.

7.3 Data archiving costs

Costs of long-term data archiving will be provided and maintained by the Coastal Field Data Collection Program.

7.4 Data archiving procedures

No transformations or procedures are necessary to prepare the data for preservation or sharing. The user has the option of selecting one of the three coordinate systems contained within each ASCII data file: (1) FRF local coordinates, (2) NAD83 geographic, or (3) NAD83 NC state plane.

In addition to the ASCII data files, metadata, reports, and research papers will be submitted to the archive to assist those using the data in the future.

All data archiving should be done through the use of the FRF Survey Loader Application, which was developed to support the FDIF program.

7.5 Data retention period

Due to the importance of collecting and maintaining a long-term climatological record, the data retention period is indefinite.

8 Hardware and Software Requirements

8.1 Hardware requirements

Based on the expected data volume, a minimum of 10 GB of disk storage is required. This provides for 5 GB of data storage and 5 GB for the OS and utilities. A minimum of 4 GB memory (RAM) is required. A multiple core Intel or AMD processor operating at 2 GHz or faster is also required.

8.2 Software requirements

Esri ArcGIS 10.1 is required to access the FRF Survey Application. The application is available as an ArcToolbox with a collection of Python modules. The FRF Survey Application is restricted to authorized users only, as its assigned permissions enable users to load and modify data available in the USACE SAM FRF survey database.

A web browser is required to access a read-only link to the published datasets. A geoplatform on http://geoplatform.usace.army.mil/ provides users with a common interface to build or access a map with FRF survey data provided in the Table of Contents.

9 Products/Programs

The following products are provided by this dataset: (1) ASCII files of point data and (2) regularly spaced interpolated grids.

Through the use of the FRF Survey Loader Application, these input products are transformed into GIS-ready datasets, which are accessible through map and feature web services. Table 1 lists FRF survey lines dataset input data and products.

Table 1. FRF survey lines dataset input data and products.

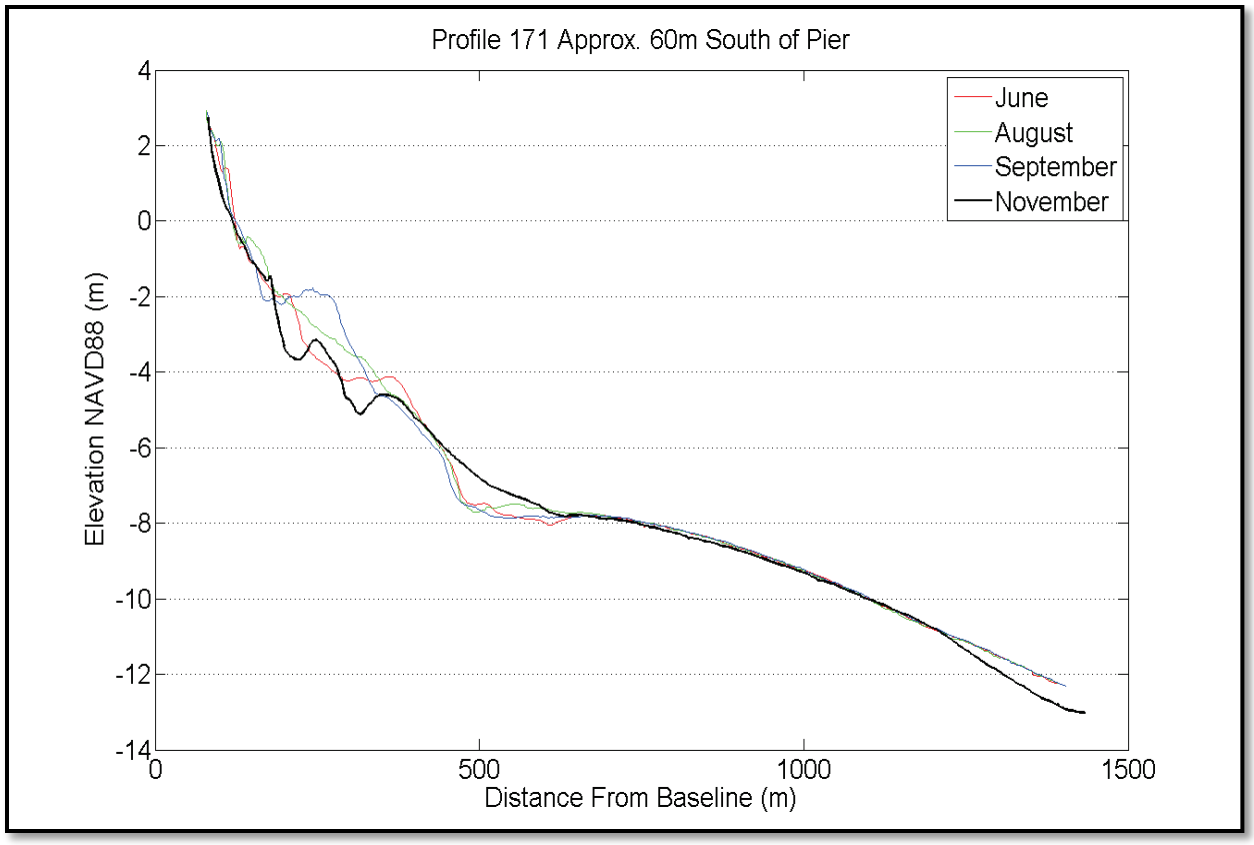
Input Data	FDIF Product	Description
ASCII LARC survey text file	GIS Feature Point Class (SurveyPoint), SDSFIE compliant	XYZ points with all attribution available in the input LARC file.
ASCII LARC survey text file	GIS Polyline Feature Class (StationLine), SDSFIE compliant	Each point is identified with a Profile #; the points are grouped and converted into a single line to represent the Profile # for the active survey.
ASCII LARC survey text file	GIS Polygon Feature Class (SurveyJob)	A maximum boundary is computed from the input LARC file.
ASCII Gridded Point survey text file	Esri Raster Grid (FRFSurvey)	An image mosaic is created—each FRF survey is converted into a raster elevation grid and appended to the master mosaic; this raster uses the coordinate system as defined by the user.
ASCII Gridded Point survey text file	GIS Polyline Feature Class (ElevationContour)	Using the geographic extent of the ASCII gridded point file, elevation contours are generated.
Metadata	Metadata Reference	Each survey dataset and all generated derivative features are assigned a metadata reference.

10 Tools

10.1 Visualization tools

Part of the survey data requirement is the ability to interact with a map (similar to Figure 1) displaying the survey lines. The user can plot individual or multiple profiles from different survey time periods either by entering a particular profile number or by selecting a region of profiles. The plotting tool allows the user to zoom to a specific area with the scale automatically updating. The plots are exportable to a variety of formats (e.g., .png and .jpg) determined by the user. An example profile plot displaying data from four surveys is shown in Figure 3.

Figure 3. Example profile plot displaying four surveys from 2013.



In addition, the elevation raster data (Figure 2), generated from the ASCII gridded points, is available in a 3D view. Other two-dimensional views of the gridded data, such as contour plots, are also available.

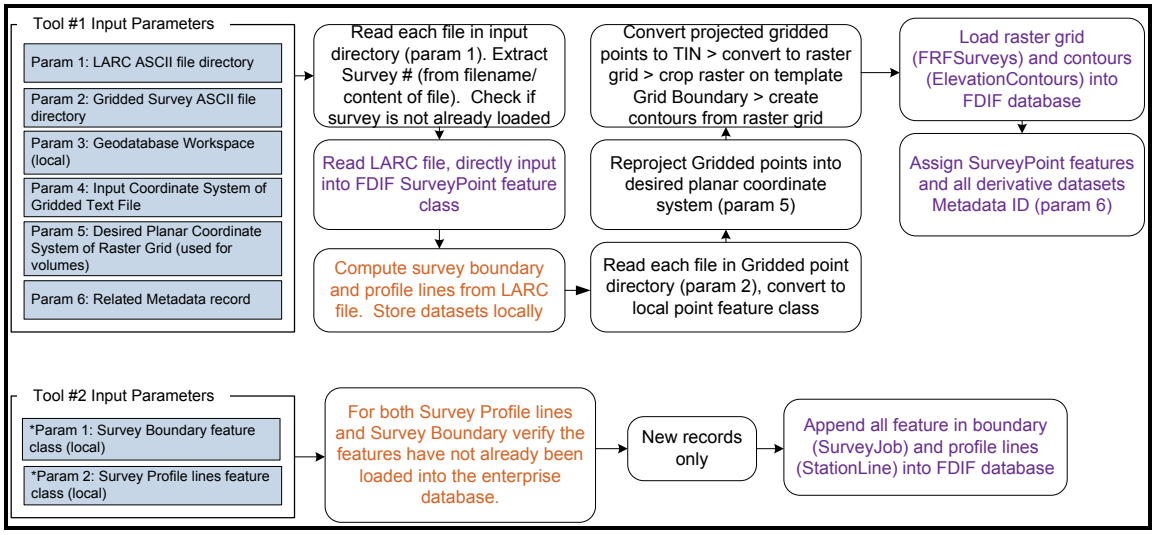
10.2 Analysis tools

Using one of the analysis tools, users can compare gridded (raster) survey datasets. The user specifies two dates (pre/post), and the tool calculates the volume difference between those two surveys. Results can be displayed as a change map, with the areas that gained, lost, or had no sediment change highlighted using an intuitive color scale.

10.3 Upload tools

Using the FRF Survey Application, original datasets undergo a series of geoprocessing steps. Each step produces a derivative dataset, including SDSFIE-formatted vector feature class (SurveyPoint, SurveyJob, ElevationContour) and raster Esri Grid-formatted datasets to represent elevation values. Figure 4 presents an overview of the FRF Survey Application workflow.

Figure 4. Overview of the FRF Survey Application workflow.



FDIF web services are responsible for transferring the data from the user's computer to the centralized database. Each web service is registered with the FDIF Metadata Manager. The services are accessible through https://gis.sam.usace.army.mil/server/rest/services/FRF.

10.4 Download tools

The FRF Survey Export tool provides a "Clip, Zip, and Ship" function in an online mapping display, allowing users to download any survey data falling within a defined area of interest and/or supplied date range. This

ASCII text file has a column for each data field collected and related metadata (see section 1.7). Users can also download the entire historical survey dataset.

Appendix A: Data Catalog; Beach and Nearshore Morphology Surveys

Description: Beach and nearshore morphology surveys (Table A1)

Table A1. Beach morphology survey data.

Source	#/ Surveys	Frequency	Duration	Formats	Archive Size	Products/Notes
Beach Morphology	~700	Monthly	1981 – January 2015	ASCII	1 GB	ASCII point and gridded files

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED *(From - To)*
August 2016	Special Report	

4. TITLE AND SUBTITLE

Field Research Facility Data Integration Framework Data Management Plan: Survey Lines Dataset

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Michael F. Forte and Rose Dopsovic

5d. PROJECT NUMBER
A1070-FY16

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Engineer Research and Development Center
Coastal and Hydraulics Laboratory
1261 Duck Road
Duck, NC 27949

8. PERFORMING ORGANIZATION REPORT NUMBER
ERDC/CHL SR-16-4

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army Corps of Engineers
Washington, DC 20314-1000

10. SPONSOR/MONITOR'S ACRONYM(S)
HQUSACE

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

This Data Management Plan details the Survey Lines Dataset which is maintained at the U.S. Army Corps of Engineers (USACE) Engineer Research and Development Center (ERDC), Coastal and Hydraulics Laboratory (CHL), Field Research Facility (FRF), Duck, NC. Information is organized within the following categories: General Description, Points of Contact, Data Stewardship, Data Documentation, Data Sharing, Initial Data Storage and Protection, Long-Term Archiving and Preservation, Hardware and Software Requirements, Products/Programs, Tools, Data Catalog, and Abbreviations and Acronyms.

15. SUBJECT TERMS

Field Research Facility, Data Management Plan, Survey, Beach Profiles, Morphology, Bathymetry, CHL, FRF

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Michael F. Forte
Unclassified	Unclassified	Unclassified	SAR	29	19b. TELEPHONE NUMBER *(Include area code)* (252) 261-6840 ext.228